

CLAIMS

1. Cyclotron (1) intended for the acceleration of a charged particle beam (16) circulating in the median plane (10), essentially being in the form of two poles inducing a magnetic field and having a so-called axial injector (100), i.e. an injector located on the outside of the cyclotron, essentially in accordance with the main axis (22) of the cyclotron, and so perpendicularly to the median plane of the same, and which is combined with inflection means (30 or 40) which make it possible to inflect the particle beam until it is positioned in the median plane, characterized in that the inflection means are made up of a magnetic inflector.
2. Cyclotron according to claim 1, characterized in that the inflection means provide the magnetic field with a horizontal or radial component at the level of the centre of the cyclotron, thus making it possible to guide the charged particle beam in such a way that it progressively inflects towards the median plane.

3. Cyclotron according to claim 1 or 2, characterized in that the inflection means are made up of ferromagnetic elements (31 and 33), preferably integrated with the two poles.
4. Cyclotron according to claim 3, characterized in that the said inflection means comprise a first element in the form of a cone (31), and a second element in the form of a ring (33) surrounding a section of the said cone.
5. Cyclotron according to claim 4, in which the axes of symmetry of the said elements coincide with the axis of symmetry of the cyclotron.
6. Cyclotron according to any of the claims 3 to 5, characterized in that it also comprises, upstream from the inflection means, guiding elements (28) for the said beam.
7. Cyclotron according to claim 1 or 2, characterized in that the inflection means are made up of rings or washers (40) assembled from individual elements which are permanent magnets.
8. Cyclotron according to claim 7, in which the said permanent magnets are made from an alloy such as a samarium-cobalt or neodymium-iron-boron alloy.

9. Cyclotron according to claim 8 or 9, in which the said inflection means are made up of a series of rings of which the central points form a trajectory in the form of a spiral helix.